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USSR Report

TRANSPORTATION

No. 39

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CONTENTS

SPECIFICATIONS FOR MOTOR VEHICLES OPERATING IN NORTH

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 2, Feb 80 pp 10-12

[Article by G. A. Krestovnikov and A. R. Nerush, candidates of technical sciences, Central Scientific Research Institute of Automobiles and Automobile Engines]

[Text] Motor vehicles operated in cold climates should perform reliably when parked outside in an ambient temperature range from +40 to -60°C and relative humidity to 98 percent at temperatures of +25°C or lower (GOST [State Standard] 15150-69).

Modifications of motor vehicles in the northern version (version KhL according to GOST 15150-69) are technically and economically feasible for efficient and safe operation in northern regions.

Motor vehicles made in the northern version should meet special specifications directed toward provision of reliability and safety of operation and also toward improving the comfort of the cab and passenger body.

The first of these requirements is related to the preferred configuration of motor vehicles in the northern version. Taking the increased danger when motor vehicles travel over snow-covered and icy roads and also the need for highly efficient heating of the cabs and passenger bodies into account with minimum exposure to cold air on their front sections, the following configurations of compact vehicles (including taxis) should be regarded as preferable for motor vehicles in the arctic version--hood version with front arrangement of the engine; the configuration for buses is hood or hoodless version with front location of the engine and that for trucks and tractors should be the hood version.

Front location of the engine increases the passive safety of the vehicles and the efficiency of the heating system and also reduces the cooling surface of the front of the cab or passenger compartment. Moreover, high coupling mass is achieved with hood configuration of incompletely power-driven trucks and tractors, which contributes to an increase of traffickability under severe road conditions (including those on icy roads). Completely power-driven vehicles of the northern version with high traffickability are designed to operate under severe road conditions and on unimproved roads accessible to wheeled transport traffic. The front-wheel drive used in these vehicles increases their resistance to skidding and consequently the traffic safety of the vehicle over slick and icy roads. Moreover, completely power-driven trucks and tractors, due to use of their total

coupled mass, can be effectively used as truck trains on roads on broken and mountainous terrain.

The starting qualities of vehicle engines for the northern version should be provided not only by operation of the engine which creates prerequisites for easy starting at low temperatures, but also the use of the appropriate fuels and lubricants, a pre-starting heating system, devices for starting a cold engine and a battery insulation and heating system. The standardized parameters of providing reliable engine starting according to OST [All-Union State Standard] 37.001.052-75 are presented in the table.

Gasoline-powered heaters of different productivity of type P and PZhB are diesel-powered heaters of type PZhD are used for independent individual pre-start heating of engines. These heaters provide simultaneous heating of the coolant and oil and consequently of the entire engine. The use of individual pre-start heaters is especially effective at air temperatures below -30°C. Effective means of facilitating the starting of cold engines at air temperatures from -30 to -12 to -20°C are an accessory for injecting a readily flammable fluid and thermal starters (the latter are used in KamAZ vehicle engines). Individual pre-start heaters may not be installed according to the customer's instructions on vehicles stored in heated buildings (garages) or on open parking areas having centralized heating.

During travel of the vehicle, the temperature regulating complex of the cooling system should provide maintenance of an optimum thermal state of the engine in all operating modes in winter and summer with regard to the fact that in winter [Translator's note: one line of text missing] is introduced into the cab-heating system, and in buses it is introduced into the heating system of the cab and passenger compartment.

A thermostat, louvers or radiator hood and blower cut-off switch are included in the temperature regulating complex of the liquid cooling system of the engine. Moreover, heating shrouds for the hood or (in hoodless configuration) of the front wall of the cab are used at low ambient air temperatures. These shrouds are made with flaps which limit air flow through the radiator. Engines with forced air cooling contain a blower cut-off and louvers in the temperature regulating complex. Some air-cooled engines have no temperature regulating complex.

The capability of a nonoperating engine to retain heat is of practical significance in cold climates. This is of important significance to reduce starting and warmup time of the engine after brief stopping of the vehicle and to prevent the water freezing when it is used as the coolant (the use of liquids that do not freeze at low temperatures is preferable for engine cooling in vehicles in the northern version). The capability of a nonoperating engine to retain heat is determined by the heat insulation of the motor compartment and is characterized by the average freezing rate of the liquid at the low points of the cooling and heating systems with the engine switched off, which should not exceed 0.75° per minute in the liquid temperature range of 85-20°C at ambient air temperature of -55 to -60°C and in the absence of wind.

Parameters of Starting Conditions	Internal Combustion Engine (Cold)				Diesel (Cold)				Internal Combustion Engine or Diesel (Warm)		
Temperature for reliable starting of engine in °C, no higher than	+40	-20	-25	-30	+40	-12	-17	-30*	-40	-50	-60
Grade or viscosity of oil in cSt, no greater than	Summer	5,000	2,800	5,000	Summer	4,000	1,700	6,000	Low-viscosity thickened (winter)		Low-viscosity thickened
Grade of Fuel	Summer	Winter			Summer	Winter			Arctic		
Time required to prepare engine for loading, in minutes, no more than	4	8	9	10	4	8	9	10	20 (30)**	30	45

*Using thermal start or readily flammable fluid injection

**Using winter-grade oil

The power system should provide uninterrupted fuel delivery, high-quality mixing and normal operation of the engine in all operating modes both in winter and summer. Vehicles in the northern version with internal combustion engines essentially have the same power system as those of basic vehicles.

Practice showed that, despite the use of winter and arctic grades of fuel, a fuel-heating system may be used in diesel vehicles. There are two varieties of this system: heating the fuel in the exhaust gas tank and heating the fuel in a special heat exchanger by the coolant heat. Moreover, reverse flow of the warm diesel fuel into the fuel-intake filter zone of the tank is provided in most vehicles in the northern version.

To facilitate operation of the diesel, it is supplied during warmup in the TS fuel mode from an auxiliary tank (the KrAZ-257S truck).

The direction of discharge of spent engine gases should not impair road visibility for oncoming and passing vehicles and combustion products should also not be permitted to enter the cab and passenger compartments.

Discharge of engine exhaust gases is usually on the right side in most trucks produced in the northern version and from the rear to the right of the longitudinal axis of the vehicle on buses, which meets the specifications indicated above and reduces the exhaust content in the zone where passengers enter the bus.

The design of the mechanical transmission should permit braking of the vehicle by the engine and starting of the engine by towing the vehicle. A transmission retarder brake (hydrodynamic built into the hydromechanical gearbox or an electrodynamic) and a backup engine starting system (manual lever, compressed air, from the starter of an internal combustion engine and so on) should be provided in vehicles with hydromechanical transmission that do not permit braking by the engine and starting by towing.

The pneumatic systems should have devices which clean the air of oil and moisture and which prevent freezing of the condensate and also valves to remove condensate from the receivers.

The electrical system should provide a positive balance of electric power during operation of the vehicle under Polar night conditions and in fog with all electricity-consuming instruments switched on, which is provided by a generator of the appropriate capacity. The electrical instruments and assemblies and also the wiring and cables should operate reliably at low temperatures and increased atmospheric humidity. They should be in the northern version for this. The bearings of electric motors (of the pre-start heater, heaters, defrosters and so on) should be filled with lubricants which ensure starting and run-up to the given operating mode of these electric [Translator's note: one line of text missing] to -60°C.

Batteries should be heat insulated and should have regulated heating from an operating engine or other heat sources to maintain the required capacity and for recharging. For example, Rodnik batteries with built-in electric heaters with the electric heat switched on automatically as a function of electrolyte temperature meet these requirements. Power is supplied to electric heaters from the vehicle

generator or from an external source with the appropriate voltage. To reduce electric power consumption for heating, Rodnik batteries in vehicles of the northern version may be placed in a heat-insulated compartment (container). Batteries used without preheating with 75 percent charge after 24 hours of idleness of the vehicle in the open air should provide reliable starting of the engine using the start-aiding devices indicated above.

If there is a reserve heater on the vehicle which consumes electricity from the battery for operation, the capacity should provide supply of the heater with electricity for 10 hours and subsequent starting of the engine, which may be related to an increase of the battery capacity with respect to a vehicle of the basic model. Vehicles should be equipped with fog lights and a spotlight controlled from the cab without opening the windows and doors and also a standardized plug to start the engine from an outside source of electricity.

A spotlight may not be installed on city buses, taxis and also on vehicles operating during short hauls in the production cycle (quarry and construction dump trucks and so on).

It is recommended that an auxiliary or intensified (80-90 dB) horn be installed to increase traffic safety due to the poor audibility of outside sounds by the driver because of the extra heat insulation of the cab in vehicles of the northern version.

The cabs and passenger compartments of vehicles in northern versions should have improved heat insulation and effective sealing of doors, windows and other openings.

The windshields should be reliably protected against fogging and icing during operation of the heating system both when parked and when the vehicle is moving, which is achieved by double glazing or glass with electric heating.

The double glazing design should provide the possibility of lowering the windows and using revolving glass for ventilation in summer. The cab and passenger compartments are heat insulated by spraying polyurethane foam on the inner metal panels, by installing heat-insulating spaces between metal panels and the inner surface and also by introduction of special removable or fixed (glued) insulating materials.

Hygroscopicity should be low in heat-insulating and upholstery materials and there should be no harmful emissions.

The cab and passenger compartment heating systems in combination with heat insulation should provide the following thermal conditions with air temperatures during movement of the vehicle and during stops: not below +10°C at the level of the small of the back of the driver and seated passengers and also in the zone of the driver's feet at a level of 100 mm from the floor and not below +5°C in the zone of passengers' feet at the level of 100 mm from the floor.

The air temperature at the level of the small of the back of seated passengers should not be below +8°C for city buses and a temperature not below -2°C is permitted at a level of 100 mm from the floor.

The temperature of the internal surfaces of the cabs and passenger compartments (with the exception of glass and components which come into direct contact with the body) should not be below 0°C.

To avoid accumulation of toxic substances, the heating systems of the cabs and passenger compartments should have basic operating conditions in which outside air is heated. Intake of air from the cab (the recirculating mode) is permitted during warming of the passenger compartment of a bus without passengers.

The time required to heat the cab and passenger compartment to temperatures not below 0°C at the level of the small of the back of the driver and seated passengers should not exceed 30 minutes.

The design of the heating and ventilation systems should provide the possibility of regulating the air temperature in the cab and passenger compartment as a function of the traffic conditions of the vehicle and the outside air temperature. Under severe conditions of Siberia and the Arctic, failure of the engine or of a vehicle heating system dependent on it, which may occur a significant distance from populated points, is hazardous to the lives of people.

A reserve heating system operating from an independent fire-safe heater controlled from the driver's cab should be provided in this regard on vehicles, except those operating on short hauling runs and in cities. The reserve heating system should operate reliably both when stopped and during motion of the vehicle and air temperature at the level of the small of the back of seated passengers or in the zone of the driver's feet not below 0°C for 10 hours with the vehicle stopped with non-operating engine should be provided.

The efficiency of the heat insulation and seals of doors, windows and other openings is checked by the average rate of air cooling in the cab and passenger compartment (in the range of plus temperatures) with doors and windows closed, with the heating system switched off and with the engine switched off. The average rate of cooling of the air should not be greater than 0.5°C per minute for the cabs and passenger compartments of small buses and should not be greater than 0.35°C per minute for the passenger compartments of remaining buses.

The design of vehicles in the northern version and their technical state during operation should provide cleanliness of the air in the cabs and passenger compartments which corresponds to the requirements of existing sanitary norms. Blowing of moisture and snow into the cabs and passenger compartments through the heating and ventilation systems and also through all gaskets is not permitted.

The heat insulation of the external compartments of vehicles should eliminate moisture or frost accumulating between the heat-insulating layer and the surfaces of the cab and body.

The outside surfaces of the cab and body are painted orange, red or yellow to improve the visibility of the vehicles on the ground and from the air under different meteorological conditions.

The tires, industrial rubber articles, plastic articles and other nonmetallic materials should have a frostproof version which ensures maintenance of their given operating characteristics at ambient air temperature up to -60°C.

Paint coating should be stable under the combined effects of temperature, humidity and solar radiation and also during sharp temperature changes and the effects of fuels and lubricants.

When vehicles are operated under low temperature conditions, winter grades of fuels, oils, lubricants and technical fluids are used which have the required viscosity-temperature characteristics and which provide trouble-free operation of the vehicle units and systems.

According to the requirements of GOST 14892-69, the fuel tanks should have a capacity which provides a vehicle range of not less than 600 km according to checked fuel consumption.

The possibility of installing winches should be provided on full power-driven vehicles. Bulk freight freezes in the body of the vehicle when dump trucks are operated under arctic conditions, which makes unloading difficult. To eliminate this, the body of dump trucks should have a heating system which is switched off when hauling flammable goods.

The guaranteed service life of vehicles in the northern version should be not less than that established for the corresponding basic vehicles. The operating instructions should include sections which reflect the characteristics of maintenance and preventive maintenance of vehicles in the northern version, preparation of the engine and its systems for starting, a list of the possible malfunctions and methods of correcting them and also additional safety requirements.

6521
CSO: 1829

MOTOR VEHICLE

ROAD CLASSIFICATION RESOLUTION

Moscow SOBRANIYE POSTANOVLENIY SOYUZA SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK in Russian No 24, 1980 pp 586-588

[Decree of the USSR Council of Ministers No 143 signed in Moscow 9 September 1980 by N. Tikhonov, deputy chairman of the USSR Council of Ministers, and M. Smirtyukov, administrator of the USSR Council of Ministers: "On Classification of USSR Motor Roads"*]

[Text] In order to improve the planning of the development of the highway network and of the use of funds allocated for the construction, reconstruction, repair and maintenance of motor roads, the USSR Council of Ministers hereby decrees:

1. All USSR motor roads shall be divided into public highways and departmental highways.

Public motor roads are listed on the inventory of highway management agencies of the union republic and are further divided according to their economic and administrative importance into national highways, republic highways, kray and oblast highways and local (not including kray and oblast roads) highways.

Departmental highways are listed on the inventory of enterprises and organizations and are classified as access roads, operations roads, farm roads, service roads, patrol roads and other roads.

2. The following are put into effect:

i. criteria for defining national highways in accordance with Appendix 1;

ii. standard criteria for defining republic roads, kray and oblast roads, and local (not including kray and oblast) roads in accordance with Appendix 2;

iii. criteria for defining departmental motor roads in accordance with Appendix 3.

It is hereby provided that motor roads shall be classified with respect to their economic and administrative importance as follows:

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* The appendices are not given.

a. for existing motor roads--on the basis of their importance in the year when the relevant list of motor roads is drafted or revised;

b. in planning development of the motor road network and in designing roads--on the basis of the importance of these roads in the last year of the prospective period as set forth in the standards in effect.

3. Councils of ministers of union republics shall:

i. submit to the Ministry of Transport Construction by 1 December 1980 proposals accompanied by the necessary justification for revision of the present list of public roads so as to take into the criteria set forth in the present decree

ii. in accordance with the standard decree to put in effect the criteria for defining republic motor roads, kray and oblast motor roads, and local (not including kray and oblast) roads, and also to see that lists of these roads are duly revised and approved during 1981.

With the help of highway administrative agencies of the other union republics the RSFSR Ministry of Roads shall draft and approve in 1981 a standard instruction on technical recordkeeping and certification of public roads.

4. Jointly with the USSR Ministry of Finance, USSR Gosplan, the USSR Ministry of Internal Affairs, the Ministry of Defense and councils of ministers of union republics, the Ministry of Transport Construction shall draft a list of national motor roads and also uniform procedure for determining distances and assigning names and numbers to roads and shall submit them in 1981 to the USSR Council of Ministers.

5. It is hereby set forth that:

i. the list of national highways shall as a rule be revised once every 5 years in the year preceding the planning period;

ii. proposals of councils of ministers of union republics to amend the list of national highways shall be examined by the Ministry of Transport Construction jointly with the USSR Ministry of Finance, USSR Gosplan, the USSR Ministry of Internal Affairs, the Ministry of Defense and the councils of ministers of union republics which are concerned. Proposals which have been cleared shall be submitted to the USSR Council of Ministers for approval.

The overall length of national highways included in the list shall be set by councils of ministers of union republics with consent of the Ministry of Transport Construction, the USSR Ministry of Finance, USSR Gosplan, the USSR Ministry of Internal Affairs and the Ministry of Defense.

6. In order to improve the planning of operations for motor road construction, reconstruction, repair and maintenance and to increase traffic safety on them, and to improve the organization of traffic on the roads of motor vehicles of various sizes and weights, councils of ministers of union republics shall in the period

1981-1985 (the RSFSR Council of Ministers by 1988) shall take a technical inventory of public motor roads.

With the help of councils of ministers of union republics the Ministry of Transport Construction shall draft and approve by 1 July 1981 an instruction on procedure for taking the technical inventory of motor roads.

7. With the help of councils of ministers of union republics the USSR Ministry of Agriculture shall draft and perform in the 1981-1985 period the necessary measures to set up orderly recordkeeping of the farm roads of kolkhozes and sovkhozes and to ensure their preservation and timely repair.

8. USSR Gosplan, the USSR Ministry of Justice and the Ministry of Transport Construction, with the help of councils of ministers of union republics and the ministries and departments involved, shall compose the draft of the Standard Road Regulations and submit it in 1982 to the USSR Council of Ministers.

The draft of the Standard Road Regulations shall prescribe the duties, rights and responsibility of road organizations and also of enterprises, organizations and individuals using motor roads and also requirements for road structures and facilities to ensure traffic safety and create necessary conditions for the work and rest of drivers and passenger services.

7045
CSO: 1829

TRANSPORT GOALS OF NEW FIVE-YEAR PLAN DELINEATED

Moscow GUDOK in Russian 1 Jan 81 p 2

[Article by Aleksey Shirokov: "The Dawn of the Five-Year Plan"]

[Excerpt] However, the BAM [Baykal-Amur Main Line] is the BAM. Under the unusual conditions here even the locomotives must be special and specialized. And where are they to be gotten if the plant still does not have a model? The conventional diesel locomotives here are not dependable. Sometimes a fire would break out in route--suddenly the train would be filled with smoke and it would get into the engine room. After stopping the train at a snow-covered station, the engineer and his assistant plunged into this stench and succeeded in eliminating the cause of the fire and also in maintaining the power of the locomotive so that it could go on. In one section they drew up to the Tynda and delivered some Neryungri coal there. The engineer was none other than detachment commissar Aleksey Sorokin. Here was where the character of a commissar carried weight! A commissar is a commissar at all times.

This was now the Little BAM was put into operation.

The historians of the future will certainly take note of the rapid entry into the 1970's of the 20th century for the country's eastern regions. It is a movement toward the sun. The oil and gas of the Tyumen' region, the coal of Ekibastuz, the superpower hydroelectric stations of Eastern Siberia and, based on them, the large territorial and industrial complexes, the new sectors of the economy and the new cities.

Here in the east there will in many respects be decided the success also of the 11th Five-Year Plan. The plan for the basic directions as submitted by the Party Central Committee for national discussion clearly defined the shape of tomorrow. You look at the map and you see: the trains run to Urengoy along the just extended railroad and gas from Urengoy is traveling at full speed through the pipe lines for the industrial Ural region. And from the other direction to here, to the Urals the distance is spanned by an electrical bridge from Ekibastuz, where they are setting up a whole constellation of electric power stations operating on inexpensive fuel. It is no longer necessary to transport energy coal for long distances. This alone promises truly enormous benefit. What difficulties the railroad workers are now running into as they deliver fuel for the electric power stations in Sverdlovsk, Troitsk, Serov and Kurgan! There are not enough cars,

the lines are overloaded, and the stations are clogged. From the administration of the Tselinnaa Railroad every "link" of its entire trip to the neighboring railroads has to be monitored to see that it gets back and that the rhythm of the coal conveyor, already strained to the limit, is not broken.

Operating as in Ekibastuz will also be the electric power stations based on the Kansk-Achinsk coal basin and the oil and gas deposits of Western Siberia as they send current along the superlong-range line to the center.

The end of the 11th Five-Year Plan. We have opened direct railroad traffic from Baykal to the Amur. And this too is not a dream but based on an already attained, wholly realistic plan. Slowly but surely the detachments of transport builders are moving toward one another from the Northern Baykal and the Tynda, from the Tynda and the Urgal, cutting tunnels in the mountain ranges, crossing many rivers, and bypassing rock volcanoes.

The introduction of the BAM is changing the map of Eastern Siberia. It will give a powerful impetus to the development of the region; it will help to uncover subterranean treasures and to build industrial enterprises. At that time there will go into operation Siberian electric-power stations each of which is equal in capacity to several Dnepr GES. One Sayano-Sushensk station will produce 24 billion kilowatt-hours a year!

The dawn of the year and the dawn of the five-year plan. Like every beginning endeavor it is nerve-racking: will everything be as we wish, as it ought to be, as we planned, calculated and stipulated? It is exciting and hence it is the expectation of something special, in every instance different from what we now have. The anticipation of something new.

Of course, some complications will ensue and difficulties will arise. The creative process is after all not any easy one. But the difficulties do not at all define its character and they do not give it structure; it is the lofty purpose for which everything is done. Such purposefulness is inherent in the very character of the Soviet individual and it is above all defined by the dynamics of our era.

We must therefore look to the morrow with confidence.

7962
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MEASURES FOR IMPROVING RAILROAD PERFORMANCE OUTLINED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 1, Jan 81, pp 106-110

[Article by Doctor of Technical Sciences, Professor N. Fufryanskiy: "Some Directions for Improvement of the Work of the Railroads."*]

[Text] The plan embodying the "Basic Directions of the Economic and Social Development of the USSR in the 1981-1985 Period and in the Period up to 1990" focuses a great deal of attention on development and improvement of transport. At the November (1979) plenum of the CPSU Central Committee L. I. Brezhnev especially emphasized the fact that along with the need for an expeditious solution of the current problems, "we must work out a long-term comprehensive program for the development of transport, a program which would encompass the best achievements of scientific-technical thinking."** To accomplish this aim we need to singlemindedly implement a unified long-term technical policy in respect to development of the railroads.

Intensification of the Use of Technical Facilities

It should be noted that in the postwar period repeated increase of the transport work of the country's railroads was accomplished almost entirely through employment of technical means. The basis of this intensification was renovation--replacement of the steam traction with electric and diesel while at the same time fully supplying the railroads with cars of improved quality with respect to reliability, sturdiness and operational characteristics; also reinforcing the tracks, introducing new signalling systems, etc.

Analysis shows that in the 1950-1978 period the rate of increase of freight turnover was approximately 20-30 times as great as the rate of growth of the operational line of the railroads; before a certain period this was technically feasible and economically very desirable. According to the estimates of the All-Union Scientific Research Institute of Railroad Transport of the Ministry of Railways (VNIIZhT MPS), in the 1955-1975 period technical progress was responsible for three-fourths of the increase of traffic capacity and four-fifths of the increase of carrying capacity of the railroads, more than 90 percent of the increase

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* In the form of a discussion

** L. I. Brezhnev. Speech at the 27 November 1979 Plenum of the CPSU Central Committee. Politizdat, 1979, p 10

of labor productivity, and approximately three-fourths of the saving in operational expenditures. In this same period about 2 billion tons of coal were saved, labor conditions were improved, and the number of persons working under difficult conditions was sharply reduced.

However, in the recent period the railroads have been experiencing difficulties in carrying out shipments, despite the fact that delivery of new locomotives, cars, rails and other equipment is continuing in considerable volumes.

The increasing difficulties and the aforementioned decline in some of the indicators for the work of the railroads are due, we believe, to two important circumstances. First, the existing system of operation of the technical facilities does not fully serve the growing requirements, performance discipline in transport is still weak, and many of the railroads are not addressing themselves sufficiently to improvement of the social conditions of the labor and life of the railroad workers, especially the locomotive and car workers, the engineers and the line personnel. Second, there are still significant deficiencies in the planning and fulfillment of the over-all proportionate development and modernization of the railroads.

We know that our native railroads, which in length comprise scarcely 10 percent of the total railroad network of the world, are handling more than half of the freight turnover of all the countries. The continually and yearly implemented freight traffic and the intensiveness of the use of the basic technical facilities of the USSR railroads are five-ten times greater than in any western country. This confirms the superiority of our national economy planning system. At the same time, in exploiting all the means of intensification we must make effective plans for the development of transport, provide for the requisite increase of the carrying capacity in specific railroad directions, prevent their full depletion and thereby avoid transport difficulties in the national economy. The need for a development of the transport links which will be ahead of schedule is dictated by the fact that, unlike the other sectors of the economy, the construction of new railroads and development of the existing ones entail extended periods of search for, and planning and creation of the requisite industrial construction capacities and the preparation of material and other resources.

Experience shows that in recent years the smallest deviation from this approach leads to substantial national economic losses. In this connection we recall that from 1950 to 1978, with a 5.6-fold increase in freight turnover, the traffic capacity of the network barely doubled. Two thirds of the length of the domestic railroads is single-track; the proportion of the more productive double-track lines has been growing very slowly for many years. The intensive development of the country's economics and the rise of new industrial regions have sharply increased the need for railroad shipments in various directions. There has gradually taken place an ever increasing concentration of shipments from the center to the east, the Volga region, Siberia, Kazakhstan and Central Asia. The over-all level of density of freight traffic and the disproportions in the loads of the railroad lines have escalated.

The most important double-track lines have been operating under particular pressure. The freight traffic and load of nearly 5,000 km of double-track lines

equipped with up-to-date means of automation and telemechanics exceed 90 million ton/km per net/km a year (including about 1,000 km of lines operating with a load of 130 million ton/km per net/km a year), which is many times greater than the corresponding foreign indicators. The discrepancy between the carrying capacity of the various railroads and the growing requirements for shipments has gradually increased because in the period from 1961-1965 to 1976-1978 the construction of new lines and additional main tracks declined to approximately 5/11 of the previous level. At the same time, in the past 25 years the extent of equipping of the existing lines with automatic blocking and dispatcher centralization increased by only 600-700 km a year. We note, in particular, that from 1960 to 1978 the making of railroad cars increased by 80 percent and the developed length of station tracks by only 30 percent, a fact which exacerbated to a certain degree the slowdown in the processing and formation of trains. At the same time, with a yearly delivery of 60-70,000 freight cars to the railroads, the distribution of these cars alone entailed an approximately 5-6,000-kilometer increase in the length of the station tracks of the railroads, not counting the necessary development of spur tracks to the industrial enterprises. Otherwise, the appearance of a considerable number of such urgently necessary new cars will only inhibit the maneuverability of the railroads.

These deficiencies are complicating the work of the railroads but the current volumes of shipments and the quality indicators are to a considerable degree affected by the internal deficiencies in management of the operational work, the increased number of breakdowns in the transport of freight, and the unsatisfactory maintenance and repair of the rolling stock, the tracks, and the other technical facilities.

The progressive experience of the Moscow Railroad collective, which increased the weight of the trains by approximately 50 percent and instituted the movement of trains with a weight up to 6,000-10,000 tons, showed that with the existing technical facilities it is possible to significantly increase the shipment of national economic freight.

Extensive application of advanced experience, improvement of the operation and repair system, modernization and development of the stations and junctions, and efficient management of the rolling stock, tracks and other technical facilities--these measures are expected to provide for further increasing the volumes of shipments up to the level of the current and near future requirements of the national economy.

Stepping up the Capacity of the Railroads by Increasing the Capacity of the Locomotives and the Carrying Capacity of the Cars

Our country has developed and is successfully operating the world's most powerful a.c. and d.c. electric locomotives. It has built sectional diesel locomotives with the following capacity: freight--4,000 h.p., passenger-4,000 and 6,000 h.p., and switching--2,000 h.p.

At the same time, the development of locomotive traction is attended by a number of deficiencies and unresolved problems, which significantly hamper the operational work of the railroads. Thus, approximately 20,000 km of the network could

increase the shipments by increasing the weight of the trains but this is not being done because of the insufficient tractive power and capacity of the locomotives in operation.

In the near future, with expansion of the proving ground for 1050-meter and longer receiving and dispatch tracks and with an increased proportion of large freight cars, such limitations in the capacity and tractive power of the locomotives will lead to falling below the weight norms for the use of trains in the 1500-1800-ton category. This will entail a reduction in the level of implementation of the carrying capacity of the railroads and in instances of the use of dual traction to economic losses in the operation and repair of the equipment.

Under these circumstances, increasing the sectional capacity of the locomotives becomes particularly important. The estimates compiled by the VNIIZhT MPS show that locomotive capacity increases which permit increasing the weight of the trains from 4,000-5,000 tons to 5,500-6,000 tons enable us to step up the shipment of heavy bulk freight (coal, ore, metal, oil, etc.) by not less than 150 million tons a year without increasing the number of trains.

In the last 10-year periods the capacity of the tractive axial force of the domestic locomotives was increased 3-4-fold with a negligible increase of the axial loads. In practice this has given rise to the attainment of an adhesion coefficient for the electric locomotives up to .27-.29, which is possible only with abundant use of sand and which adversely affects the dependability of the locomotives and their basic equipment as well as the service life of the rails.

However, the axial capacity of the locomotives can be increased up to specific maximums because the tractive capacity of the locomotive, like that of any transport means, depends on the adhesion of the wheels to the rails. With high adhesion coefficients, the locomotive runs the train with the use of sand, not only in the usual way with starting and climbing a ruling gradient, but also a great part of the time in a traction and braking cycle which leads to accelerated wear and tear of the rails and wheels. Because of the lack of more powerful locomotives, to increase the transport we can in the near future employ the emergency, although uneconomical, way--use of the total capacity by increasing the number of sections of the locomotives. When the adhesion reserves are exhausted and consequently also the axial (sectional) capacity of the locomotives, then there is no alternative but to step up the capacities by increasing the axial loads. This method has for many years been employed in the United States and Canada, where they use locomotives with an axial load of about 30 and more tons.

Since extending the use of these locomotives on the domestic railroads would be impractical because of the possibility of intensifying the effect of heavy locomotives on the track, we have pursued a new direction in the development of freight locomotives with moderately increased loads, one based on the use of frame trestle suspension of traction electric motors. This increases the dependability and service life of the locomotives and reduces their effect on the track; it is like merging the principles of planning of freight and passenger locomotives.

However, some workers have contended for many years that increasing the axial loads of the cars by 2-4 tons and the locomotives by 3-5 tons leads to a considerable increase in the frequency of replacement of the rails.

To determine the validity of these arguments, which bar the development of rolling stock with increased axial loads, extensive theoretical and experimental work has been done in the last 10 years.

The research carried out in the MPS [Ministry of Railways] system and by the locomotive building plants and the scientific research organizations of the industry did not support the opinion that moderate increases of the axial loads of the rolling stock produce a considerable increase in the destructive effect on the track. It was found that a relatively small increase in the axial loads, an increase which is very important for stepping up the carrying capacity of the railroads, does not have the effect on the service life of the rails that was previously assumed. It was determined that other factors, such as the quality of the composition of the track, the wear and tear on the rails and wheels, the nature and area of the contact between the wheels and the rails, the number of loadings on them, etc., exceed the effect of the investigated increase of axial loads.

The research done enables us to make recommendations for the development of future locomotives with designs which should conform to the technical requirements approved by the MPS back in 1972, designs for locomotives with axial loads of about 27 ts [tons force]. With respect to the provision of locomotive traction for the heavyweight trains on the newly planned railroads of the East-Center type, for them no time must be lost in ordering even more powerful experimental locomotives in the following capacity category (4 and 6-axle electric locomotives with an axial capacity up to 1,000-1,200 kv/tons and an axial load up to 30 ts.)

Thus, the planning organs and the MPS can select one of two ways to provide for the tractive capacity of the locomotives for fulfillment of the growing transport requirements. The first is to develop more powerful locomotives, a task which directly involves increased axial loads and the making of fundamental improvements in the locomotive design. The second is to retain the existing designs but to employ sectionalizing to assemble the total locomotive capacities necessary to provide for operating the heavyweight trains. The latter approach involves an increase in the quantity of the locomotive fleet and in the personnel strength of the locomotive crews, a reduction in the usable length of the trains, increased requirements for repair enterprises, and expenditures for operation and repair.

The economic impracticality of the use of multisection locomotives is confirmed by the following examples. When 3TE10V (3 x 3,000 h.p.) three-section diesel locomotives are replaced by 2TE121 (2 x 4,000 h.p.) two-section ones, the expenditure of fuel is reduced by at least five percent, the number of maintenance personnel by approximately 35 percent, the expenditures for repair, the number of depot bays and the required section inventory by 30 percent, and the length of the locomotives by 19 meters. The calculations indicate that, for example, for a 6,000-8,000-ton train of the near future and a ruling gradient of 9-11 percent, the increase in the number of axles of the multisection locomotive with a series axial load (23 ts) and a future load (30 ts), the number of axles is increased to 3 to 5 and with future increase of the weights of the trains and the speed of

movement (for which the locomotive traction must be adapted), then the increase in the number of axles is 8 to 10.

Increasing the axial loads of the locomotives is not only quite essential from an operational standpoint but the findings of the plants and institutes show that, for example, with an axial load of 25 tons it is not possible with modern technology and materials to build a.c. locomotives with an axial capacity of about 1,200 kvT (kv/ton]. Developing dependable and durable sectional 6,000 h.p. locomotives is also difficult because it requires an axial load of 26-26.5 tons; it would otherwise be necessary to develop a new diesel engine 4-6 tons lighter and with, of course, less motor capacity. This will take many years.

Increasing the transport capacity of the railroads depends to a considerable degree on the carrying capacity of the cars. The 1977-1979 increases made by the MPS in the carrying capacity of some of the railroad cars on hand demonstrated the favorable effect of this measure. For the fleet of railroad cars the static load increased an average of .73 tons in 1977 and .49 tons in the first quarter of 1979; this is equivalent to a 50-70 million-ton increase in the volume of freight shipments.

In the 1973-1978 period the experimental link of the VNIIZhT MPS carried out comprehensive research on the track and series cars when the axial loads are increased to 23 and 25 ts. This research demonstrated the effectiveness and desirability of increasing the axial loads to 23 tons in the currently operated cars which were built after 1963 as well as the real possibility of building and normally operating new freight cars with an axial load up to 25 ts.

For purposes of a more substantial increase in the carrying capacities of the railroads, tests were carried out on experimental models of two-axle flatcars designed for an axial load of 25 tons. It was found that in durability characteristics and effect on the track such cars satisfy the requirements of the MPS but it would be necessary to increase the usable capacity of the cars by increasing the size of the body.

It was several years ago that suggestions were made to order an experimental batch of flatcars with increased axial load for an operational check. But this important and useful suggestion is not being implemented on the grounds that a change to the production of new four-axle cars will allegedly deter the manufacture of the eight-axle cars which are more advanced in respect to increased carrying capacities of the railroads, although mass production of these cars is, unfortunately, not planned for the next few years. It would seem that it does not make sense to oppose these types of cars and to choose only one of them when you consider the circumstance that it will be difficult to satisfy the requirements for eight-axle cars within a brief time and also the fact that in the distant future a considerable proportion of the rolling stock will consist of four-axle cars.

Increasing the transport capacity of the railroads by stepping up the power of the locomotives and the freight capacity of the cars, in conjunction with other measures (development of the centers and stations, construction of double-track additions, automation of the control of operations, etc.) will go a long way toward resolving the transport problem.

Selection of the Principal Direction for Development of the Railroads

Both in the current years and in the forseeable future railroad transport in the USSR will continue to occupy a leading place among all the types of transport with respect to volume of shipments. In the Soviet Union the railroads play a more important role in the over-all transport system than they do in the other countries of the world. This is due to the extent of the territory, the geographic and climatic characteristics, the opening up and rapid development of new economic regions, the need for year-round dependable transport links connecting the remote industrial and economic centers, and the economic effectiveness of the railroads in comparison with the other means of transport. It may be assumed that the current situation with respect to fuel and energy resources and the need for a careful policy respecting their use are factors strengthening the role of the railroads in many of the countries of the world.

The USSR planned system of national economic development has engendered a high degree of effectiveness in the use of its domestic railroads, which handle a freight traffic with indicators several times greater than the corresponding ones in the western countries. However, since any technical facilities have their own optimum levels of intensive utilization, the railroads and the level of technical development must also be examined from this standpoint. It is therefore essential to maintain a strict alinement between the economic development of the regions and their transport links. When the carrying capacity of the railroads lags behind the evolving needs for raw materials and materials, this may retard the development of these regions and engender economic losses which considerably exceed the cost of construction of new railroads or modernization of the existing ones.

Experience shows that regularly exceeding the normal load level of the railroads when they have to operate without any reserves often leads to a slowing of their movement and large economic losses. At the same time, domestic and foreign experience indicates that stable and dependable operation of the lines with allowance for the differences in their load and in the weather and seasonal conditions requires that the traffic capacity be maintained at a level of 75-85 percent and that a large proportion of our network operate with full attainment of the projected traffic and carrying capacity.

The yearly investments made by the MPS for the purpose of development of the traffic capacities of the busiest roads, extensive application of the experience of the advanced collectives in the operation of maximum weight trains, the change in a number of sectors to mass use of double trains, the implementation of the engineering findings with respect to further intensification of the available technical facilities, improvement of the system of management of operation and repair in all the sectors of the transport--all these measures can in the next few years provide for the necessary increase in the volumes of shipments. However, if we examine the transport problem of the USSR as a whole in light of the prospects for the development of the national economy of all the country's regions, then we see that this is not enough because the complex of these measures for increasing the volume of shipments will be rapidly swallowed up by the growing requirements. A fundamental solution of the problems requires a single general plan for the construction of new railroads and development and

modernization of the existing ones, a plan geared for the long term. This plan is also needed because new construction entails large capital investments and labor input which go beyond the development of the prospecting and planning work. It also requires the establishment of an industrial base for the construction organizations and the appropriate capacities in industry.

When there is a long-term general plan and a clear-cut yearly plan for its fulfillment, then the problems of the development of the domestic railroads can be fully resolved and the necessary reserves of carrying capacity accumulated.

The selection of the chief direction for the development of the domestic railroads is the subject of a great deal of research. In particular, a number of published works recommend that the principal direction of the new restructuring of transport be the further intensification of the use of the technical facilities, the maintenance of the capacity characteristics of the locomotives at the existing level, orientation for the production only of eight-axle cars, and reduction in the future of the intervals between motive trains. Also, we do not consider sufficiently justifiable the idea of the desirability of investing capital outlays in the currently operating railroads because of the relative and absolute increase of the cost of new construction.

Examining the current status and the prospect for the development of the domestic railroads should not, we believe, be set off against the various methods and ways of improving and expanding the network of these roads. The time has come to prepare a single over-all state program for modernization of the existing railroads and all the technical facilities, for intensification of their use, and for the construction of new main lines. It would be hard to overestimate the affirmative impact of such a purposeful long-term program for the successful development of railroad transport and, consequently, of the entire national economy. The need for a program of this kind is a long-standing one.

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PLANS TO BRING ABAKAN RAILROAD CAR CONSTRUCTION PLANT TO FULL CAPACITY

Moscow PRAVDA in Russian 12 Dec 80 p 3

[Article: "Railroad Car from Abakan"]

[Text] It is the end of the year. The enterprise's collectives are striving honorably to complete the five-year plan, to fulfill the plan and the socialist commitments. Many have turned out the planned production. However, in order for the plan to be realized, the products must still be sent to the customers. Empty railroad cars are needed but the railroad is coming up with an insufficient number of them.

Railroad cars have become just about the biggest shortfall in recent years. The MPS [Ministry of Railways], the various central organs, and the newspaper editorial offices receive many letters and telegrams with requests for help in obtaining empty railroad cars and in somehow influencing the railroad workers.

Why has such a situation arisen? Who is to blame? The current opinion is that all of this is caused by the poor utilization of railroad cars. The enterprises, they say, load and unload them slowly; the railroad workers move the trains poorly. The carrying capacity, the rolling stock tonnage, is also far from being fully used. Indeed all of this, as they say, has its place. There is no doubt that the turnaround time for rolling stock must be speeded up. We should struggle most decisively to reduce each and every kind of delay and not allow railroad cars to leave on a run half-empty. The improvement of the transportation process will undoubtedly have a large impact but will not fully solve the railroad car problem.

The shortage of rolling stock started to be felt a long time ago. With the transfer to new types of engines--electric and diesel locomotive, the increase in travel speeds, and the mechanization of loading and unloading, the work intensity of railroad cars grew sharply. They started to wear out quickly and be damaged more often. The manufacture of new ones grew very slowly. The modernization of operating railroad car construction plants was seriously delayed. It was done in an uncoordinated fashion, and new ones were not generally being built. There was an inadequate supply of many complete units even for the planned output of railroad cars. Thus, there were no resources at the Ministry of Heavy and Transportation Machine Building enterprises for the production of about 100,000 pairs of wheels. How did they get out of this situation? The repair plants of the Ministry of Railways supplied 80,000 and the remaining ones were manufactured under semi-primitive conditions.

Soon afterwards, because of the increased wear and tear on the running gears, the railroad workers themselves lacked sufficient pairs of wheels. After a number of warnings, the Ministry of Railways stopped the delivery of these devices to the railroad car builders. The output of new rolling stock slackened. Of course, there were other reasons but the shortage of wheel pairs was the main one. In the 10th five-year plan the output of new railroad cars at Mintyazhmash [Ministry of Heavy Machine Building] enterprises alone decreased by more than 7,000, and by 13,600 throughout the country as a whole.

Now many railroad cars on the country's mainlines are destined to be turned into scrap metal. However, they continue to run. The following example illustrates how this has changed things: the ordinary railroad car goes into regular maintenance once a year but a car destined for the scrap heap--up to 40 times. It is put out of operation for several months of the year because of downtimes in waiting for servicing in a depot and in repair itself. The repair facilities are jammed with "sick" cars. Additionally, it is necessary to limit the speed and carrying capacity for such shabby rolling stock. If you have only one such car in a string of cars, the entire train must slow down.

There is one way out of this situation--to quickly develop railroad car building. It is easy to understand with what pleasure the railroad workers greeted the decision to build the Abakan Railroad Car Building Plant. This was in May of 1968. Plans called for the plant to produce 40,000 eight-wheel cars a year, of which more than 10,000 would be all-metal 16-wheel gondola cars which would permit a 35 percent increase in train weight without the necessity to reconstruct stations and the stages between stations. However, this was not all. After the start of the first section, the railroad car building industry must obtain more than 200,000 tons of steel castings and 80,000 pairs of wheels yearly from Abakan.

A special trust Abakanvagonstroy [Abakan Railroad Car Construction Trust] was created in the Ministry of Construction of Heavy Industry Enterprises to construct a railroad car building giant at a cost of almost 700 million rubles. It was declared to be an all-union key construction project. The work began in 1970. The builders hurried. The first cars had to leave the factory in 1976. Suddenly the noise at the projects died down and all work stopped. What had happened?

Gosplan USSR felt that large shipping containers were more important than railroad cars at that time. So construction on an enterprise to produce them was started in this very same area. As a matter of fact, yet another giant with an annual production of 40,000 large shipping containers had to be constructed. The capital of the Khakasskaya Autonomous Oblast was turned into a large transport machine building center. They planned to begin to manufacture containers within a very short period of time.

They did not succeed in constructing the new enterprise within this narrow time frame. They started to weld the first 20-ton containers almost five years later. New miscalculations by the planning organs were discovered here. A large amount of special rolled metal, lumber, paints, and chemicals were required for the production of 40,000 large shipping containers. It turned out that the Ministries of Ferrous Metallurgy and the Chemical Industry were not prepared to ship them. The fickle foreign lines "balked" at processing non-standard rolled metal and inferior timber. There were many defects. Now the plant, although in operation, is manufacturing only 5,000 instead of 40,000 large shipping containers.

One would think that after the completion of the container production construction, even if six years late, work would be opened on the railway car construction projects. However, they do not intend to do this for the present. Mintyazhmash has received the task of beginning the construction of yet another giant--an excavator plant in Krasnoyarsk. Funds and materials have been directed here. A small amount of capital investments has been alloted to Abakanvagonstroy itself.

GUDOK has related the miserable construction epic at Abakan. The newspaper article irritated the Gosplan division. The editorial board received a formal written answer: "At present Gosplan USSR," reported the chief of the division of heavy, transportation, and road construction machine building O. Pashchenko, "with the participation of the ministries and departments is developing the plan 'Basic Trends in the Economic and Social Development of the USSR in the Years 1981-85 and for the Period up to 1990,' which will provide for the necessary production volumes of mainline freight cars as well as the development of railway car building including the Abakan Railway Car Building Plant."

What necessary railroad car production volumes and railway car construction development is he talking about specifically? This is not clear from the answer. However, we are trying to cite data of the Ministry of Heavy and Transport Machine Building. Here they know not only about deeds but also about plans. The chief engineer of Soyuzvagonmash /Railroad Car Machine Building Trust/ I. Baggonov informed the GUDOK editorial board about them. They intend to earmark 70 million rubles for the construction of the Abakan plant in the 11th five-year plan. This is less than ten percent of the total estimated cost.

The paradoxical thing is that, having almost ceased to finance the construction project in Abakan, they have, at the same time, planned to create for the nonexistent plant by 1980 resources for the output of 1,100 ordinary tank cars, 300 16-wheel cars, 40,000 pairs of wheels, 20,000 tons of forgings, and 14,000 tons of springs. And they have not even started in the 10th five-year plan to construct the projects for which these resources are being created.

One should add to this that the over-all plan for the development of railroad car construction also provides for the construction of a semi-sloped trolley shop with a capacity of 60,000 pairs of wheels at the Altayskiy Railroad Car Building Plant. However, it was not just all of the work that ceased here a long time ago--the construction organization also completely collapsed.

There is yet another aspect of this problem--the moral aspect. The construction of the plant in Abakan was declared to be an all-union key construction project. This means that all work must be conducted here in a model fashion and each kilogram of metal, cement, and each ruble of capital must be used wisely. How did this business turn out? Some 150 million rubles were invested in ten years at Abakan for foundations and empty frames and also for equipment. Yet practically no output was obtained. The young people who arrive at the key construction project see all of this. They look and are amazed--why is no one made answerable for such planning?

Transport, and really the entire national economy, cannot manage without Abakan railroad cars. The plant must be finished. Therefore the following should be written down in the Basic Trends Plan: "To bring the Abakan Railroad Car Construction Plant to full capacity and to organize the mass output of 16-wheel gondola cars."

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BRIEFS

FIRST PASSENGERS--The first passengers were admitted to the new railroad station of Kansk, a large industrial city of Eastern Siberia, located on the Trans-Siberian Railway. A two-story glass and aluminum building has replaced the old station which was built back in the prewar years. The over-all area of the railroad line's "new settler" is more than 8,300 square meters. All the conveniences have been provided for the passengers here--Yu. Yur'yev--Kansk, Krasnoyarskiy Kray. [Text] [Moscow TRUD in Russian 18 Jan 81 p 1]

COMPANY TRAIN--Karaganda 24th (PRAVDA correspondent Yu. Razgulyayev)--A train bearing the inscription "Sary-Arka" left recently from the platform of this mining city. And in 16 hours its passengers were already in Alma-Ata. Thus began the regular trips of the new company train. It has greatly shortened the trip from Karaganda to the capital of Kazakhstan. The comfortable cars of the train are attended by Komsomol youth conductor crews. [Text] [Moscow PRAVDA in Russian 25 Dec 80 p 6]

TRAINS ON THE BAM [Baykal-Amur Main Line]--Urgal (Khabarovskiy Kray). Last year the builders of the Baykal-Amur Main Line completed the laying of the tracks from Urgal to Komsomol'sk-on-Amur, opening the route for freight trains. And not long ago the Chegdomyn-Berezovka passenger train made its first regular trip. There is now dependable railway service linking most of the stations of the eastern sector of the line. A difficult task now faces the builders--before the end of the year putting into regular operation the 120-kilometer sector of the railroad from Komsomol'sk-on-Amur to Berezovka. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 21 Dec 80 p 1]

CONSTRUCTION OF NEW LINE--The builders are confident of shortening the time for putting into operation the republic's major construction project of the 10th Five Year Plan--the Masis-Nurnus railroad mainline. Traffic on it is scheduled to be opened in December 1980. The construction was carried out under difficult natural conditions. It was hindered by underground waters and difficult terrain. The construction project became a unique proving ground. Some of the machines and mechanisms which were tested here are now being used successfully on the BAM [Baykal-Amur Main Line]. M. ..aktorova (TASS). Masis, Armenian SSR. [Excerpts] [Tallinn SOVETSKAYA ESTONIYA in Russian 28 Nov 80 p 4]

NEW ELECTRIFIED LINE--Yesterday saw the beginning of operation of a new electrified line of the Oktyabr' Railroad, one linking stations Chudovo and Volkhovstroy. Heavyweight trains are now able to run between the northern and central regions of the country, bypassing the Leningrad transport center.--Leningrad. [Text] [Moscow TRUD in Russian 20 Dec 80 p 1]

REMODELING OF TRAIN DEPOT--Specialists of the Moselektrotyagstroy [Moscow Electrical Transport Construction Trust] have begun work on the rebuilding of the suburban depot of the Kiev station. Slated for replacement there are the tracks, the switches, the contact network and the platforms. The remodeling will enable them to accommodate electric trains of 12 and more cars at the suburban platforms of the Kiev railroad station. For the time of operation they have assigned for the electric trains tracks leading to the station platform. The reconstruction will bring about a significant improvement in the railroad link between Moscow and the suburb. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 28 Nov 80 p 3]

NEW RAILROAD LINE--Operation has begun for the Surgut-Urengoy railroad line, nearly 600 kilometers in length. The first train has arrived at its terminal. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 2, Jan 81 p 3]

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EQUIPMENT AUTOMATION IN 11TH FIVE-YEAR PLAN

Leningrad SUDOSTROYNIYE in Russian No 2, Feb 81 pp 28-30

[Article by O.P. Demchenko, V.V. Voytetskiy, V.N. Yung]

[Text] As is well know, the principle thrust of the Soviet Union's economic development in the 10th five-year plan was the improvement of industrial efficiency and the quality of production, linked to the intensification of industrial processes. One of the most effective intensification methods is industrial automation, reducing manual labor costs and raising the quality of the automated technological process. The process of naval equipment control is no exception. For a long time, work has been carried out toward the creation of control systems which could bring about the integrated automation of naval equipment, at the same time again having guaranteed the conferment upon the ships under construction, of the automation symbol A2, to begin with, and then A1, in the notation of the class of ships of USSR registry.

From the standpoint of widespread distribution of integrated automation aboard ships, a great deal was accomplished in the past five-year plan. During this entire period, serial production of the famous "ZALIV" first generation control systems complex, begun in 1973, was carried out. Nearly 140 diesel-powered vessels of 14 designs--container carriers, ore carriers, refrigerator ships, general purpose cargo ships, tankers, oil and ore carriers and others, viz., practically all ships built by domestic industry [and equipped] with low-rpm DKRN type diesel engines of various dimensions, from the industrial firm [called the] Bryansk Machinebuilding Plant.

The "ZALIV" complex, corresponding in the extent of its automation to the designator A2, in the notation of the class of ships of USSR registry, comes well-recommended under operational conditions. All its component systems received the quality indicator. Ships equipped with this complex have continuous monitoring only at the main control console; in the engine room (at the [equipment] platform and at the main control console), generally, there is no continuous monitoring. Ships supplied for export are similarly equipped with these control systems.

"TROPIK," a similar systems complex for gas turbine vessels, based upon the "ZALIV" complex, has already been installed aboard two vessels with horizontal cargo handling--the "Kapitan Smirnov" and the "Kapitan Mezentsev," which have also received the A2 automation designator.

In the 10th five-year plan, on all the tankers of the "KRYM" type, there was installed a similar "PROLIV" type control systems complex for equipment including a steam turbine unit with a variable-pitch propeller. Although these vessels did not receive an automation designator, in USSR registry class notation, on the whole, the control systems making up the complex came well-recommended under operational conditions.

Finally, in this same period, the operation of significantly better developed automation complexes of the "SEVER" type was begun aboard the atomic-powered icebreakers "ARKTIKA" and "SIBIR'" and is being successfully carried out.

Thus, nowadays, practically all types of ships are equipped with system complexes for equipment control from the main control console and from the operations room. This qualitatively affects the very nature of the work of the ship's crew which, until recent times, was still quite closely linked to the manual control of mechanisms in various ship's compartments where elevated levels of temperature, vibration and humidity are often encountered. Remote automated control and the monitoring of the operation of mechanisms under the comfortable conditions of the main control console or a similar control station for cargo [handling] operations has become the standard.

In the past five-year plan, the construction of a "ZALIV-M" type complex--a second generation of equipment control systems for diesel-powered vessels--was intensively pursued. By 1978, the complex had successfully completed interdepartmental testing; the initiation of its serial production and its installation aboard all newly constructed diesel-powered ships is the most important task of the 11th five-year plan.

The complex "ZALIB-M," like the one before it, consists of a group of the following automated guidance and control systems, specialized by functional designation:

--type "SHIPKA-M" data [system]--for the control of naval equipment;

--the "IZHORA-M" [system]--for the control of the electrical power installation;

--the "PRIBOY-1" [system]--for the control of the engine room's auxiliary mechanisms;

--the "NAROCH'-M" [system]--for the control of general purpose naval system mechanisms;

--the "ILMEN'-M" [system]--for remote control of tanker cargo [handling] operations;

--the "VIKTORIYA-M" [system]--for controlling the mechanisms of a naval inert gas system;

--the "TANGENS" [system]--for centralized powering of the systems of the complex.

Along with the "ZALIV-M" complex, the "GROM" system of automated remote control of the main type DKRN engine, from the operations room, has been installed aboard ship. [The "GROM" system] has been in serial production since 1978 and is presently used along with systems of the "ZALIV" complex. The second generation of this system, based on new microelectronic elements, has to be built in this five-year plan.

One ought note that the "ZALIV-M" complex will also be used aboard vessels with medium-rpm diesel engines from the "RUSSKIY DIZEL'" plant, equipped with this plant's automatic remote control systems.

The sytems of the "ZALIV-M" complex are built upon a modern element basis (miniature relays with hermetical contacts and microcircuits), basically have modular channel and, in certain cases, functional block structure, unitized construction, significantly more well-developed than in the systems of the "ZALIV" complex, and a built-in monitoring. The high level of unitization of these systems and the ability to produce their various modifications based upon a single set of devices allowed one to proceed to the development of the system, of automated design, into a unified digital computer system for multisystem documentation. The initial phase of the system comprising one of the component parts of the complex has already been put into operation.

To a significant extent, the functions of the systems of the "ZALIV" and "ZALIV-M" complexes are identical. However, there are appreciable differences. They essentially have to do with the establishment of a generalized emergency and warning signal as to parameter deviations in the engine room. In the "SHIPKA-M" monitoring system, along with individual signalling of discrepancies at the main control console via the "PRIBOY-1" system and generalized critical and non-critical signalling in the cabins of the ship's mechanics and certain ship compartments, so-called address signalling is envisioned. The latter is installed at the entrances to the engine room and decodes a generalized signal by groups ("addresses"), thereby indicating in which region of the engine room or in what piece of equipment there is a parameter deviation. This permits the mechanic to direct himself to the proper location in the engine room, directly from his cabin and without stopping off at the main control console.

[LEGEND FOR THE SYSTEM COMPONENT DIAGRAM]

"ZALIV-M" CONTROL SYSTEMS COMPLEX

a - the wheel house; б -crew compartment (shown are the generalized signalling assemblies); в -main control console; г -engine room; д -inert gas control station; е - cargo operations control station.

1 - main engine automatic remote control system instrumentation

2 - centralized control sys[illegible] instrumentation

3 - system instrumentation for the control of engine room auxiliary mechanisms

4 - electrical power station control system instrumentation

5 - general purpose naval systems control system instrumentation

6 - inert gas system con rol system instrumentation

7 - cargo [handling] operations control system instrumentation

8 - main power plant remote control system (not part of the complex)

9 - main switchboard

In the "SHIPKA-M" system, there was also envisioned the processing of signals from the thermocouples measuring the temperature of the exhaust gases in each engine cylinder. Thus, not only is there provided the readout value of these parameters on the main control console and warning as to their deviations but even the averaging out of the temperature and the comparison of nominal and average values. Generally speaking, in the "ZALIV" complex, the monitoring of exhaust gas temperature was not carried out for a long time. This function was carried out by means of imported gear. In 1978, a domestically produced device for monitoring exhaust gas temperature was installed aboard the diesel-powered vessel "Sovetskie Profsoyuzy." It proved itself well for operational use and since 1980 has been installed aboard ships as part of the "ZALIV" system. As indicated above, in the "ZALIV-M" complex, this function has been carried out, from the very beginning, according to an appreciably more expanded algorithm and in essence allows the ship's mechanic to carry out diagnosis of the main power plant's cylinderr, according to a single one of the most informative and essential parameters. The algorithms for the automated control of auxiliary engine room mechanisms and general purpose naval systems have also been expanded. All in all, the systems of the "ZALIV-M" complex permit steam navigation to continue the resolution of an important social problem begun with the installation of the first "ZALIV" complexes--a reduction in the expenditure of labor for the control and servicing of transport ships, the reduction in crew strength attendant thereto and the raising of their required level of qualification.

Systems of the "ZALIV-M" complex have already been installed on the main tanker "POBEDA." At present, their "hookup" aboard ships of an additional four projects is being carried out. The complex makes it possible (with appropriately designed basic and auxiliary equipment) to guarantee the conferment of the A1 [automation] designator to the ships--[signifying] the absence of continual monitoring at the main control console while asea and at anchor. The overall composition of the instrumentation of the systems of the complex is depicted in the drawing. With regard to broadening the distribution of the "ZALIV-M" complex, the production of the "ZALIV" complex will be gradually reduced (by means of the completion of the construction of suitable series of vessels).

In the 11th five-year plan, work will be begun toward further improvement of the systems of the "ZALIV-M" complex. This touches upon two questions in particular--control automation and the management of cargo [handling] operations aboard tanker vessels and the intensification of monitoring of the main power plant with the aim of furnishing its technical diagnosis.

The principal problem, linked to the need for improving navigational safety, is the monitoring, not only of the fluid levels in the cargo and ballast tanks--this is already being done at present--but even of the bending moments and the shearing forces in certain sections of the ship's hull during cargo [handling] operations, of the measurement of the variation in the ship's draft at the prow or stern and of other parameters. At the same time, the actual amount of liquid in each tank is determined and overall control of the implementation of the cargo loading plan is exercised. The exercise of such control and the attendant monitoring of cargo pumps and rotating shutters requires the inclusion, in the main control console system, of devices for machine-sensor communication and of new means for data presentation.

At present, the manufacture of such a system has already been begun on the basis of the results of the development, in the previous five-year plan, of the first data management computing system built to fit into the equipment [complement] of the "KRYM" tanker [2]. In the new five-year plan, aboard "POBEDA" type ships, one must begin working out the first such systems of automated control and monitoring of cargo [handling] operations in conjunction with the "ZALIV-M" complex and its component remote control system, "ILMEN'-M."

As mentioned above, the second task is linked to the problem of the technical diagnosis of a type DKRN diesel engine. This problem has long been discussed by our scientific and technical community and, to wit, in the 11th five-year plan, it is necessary to begin manufacture of the first technical diagnosis system which will then become a component part and an outgrowth of the "SHIPKA-M" data system, comprising part of the "ZALIV-M" complex. Work is to be done toward modernization of this complex and in line with other trends.

In the current five-year plan, there will be developed a design for ships for routine navigation in the Arctic basin. The uniqueness of the technical decisions as to naval power engineering and the different types of naval equipment aboard these ships will even require the development of a new complex of automated control systems, essentially utilizing digital computer technology.

One of the most important problems which must be resolved during the 11th five-year plan is the problem of building a system of dynamic stabilization for semi-immersible drilling rigs; this sytem should provide [for] the confinement of a ship to a given ocean locale, with extremely high accuracy and under conditions of constant wind and wave stresses and the action of the drilling device. The system devised for these purposes should provide the solution of complicated algorithms and thus will also be constructed on the basis of a main control console.

Thus, the 11th five-year plan is one for the production and introduction of new generations and types of equipment control systems aboard ships; there's no doubt that the problems posed will be successfully resolved.

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CSO: 1829

COMPETITION IN TRANSPORT REPORTED

Moscow MORSKOY FLOT in Russian No 11, Nov 80 pp 4-5

[Article by V. Artyukhov, chairman of the Black Sea Baskomflot, and V. Merem'yanin: "Full Transport Worker Competition"]

[Text] In October 1976 a joint meeting of the administrations of the Black Sea and Soviet Danube steamship agencies, the Odessa Dorprofsozh [Railroad Committee of the Railroad Transportation Workers' Trade Union], the Odessa Railroad, and the presidiums of the Black Sea and Danube Baskomflot [Basin Committee of the Trade Union of Workers of the Maritime and River Fleets] discussed the initiative of the acceptance and transfer personnel of the Odessa Railroad and the Black Sea and Danube dockers on improving the use of the means of transportation. This joint meeting approved the valuable initiative "an additional 1,000 kg of freight for each railroad car." The initiative was founded on the general "thousanders" [one achieving output of a thousand units] movement.

During the more than three years of socialist competition the seaports and preport stations accumulated rich experience in the compact loading of railroad cars. Let's take the port of Odessa as an example. In 1979, 111,690 railroad cars were loaded here, including 84,364 cars loaded by the compact method. An additional 261,769 tons were loaded.

Some 311,720 cars were loaded by the compact method since the start of the "thousanders" initiative. This resulted in the transportation of 713,370 tons of imports above the norm without the need to use additional rolling stock. This freed 14,700 railroad cars.

Outstanding compact loading masters who dispatch an additional 1,000, 2,000, and more kilograms of imports in each car developed during the competition. Among them were the teams of docker-machine operators of I. Spodarets (port of Il'ichevsk), N. Grigorenko and D. Kutnayev (port of Odessa), N. Ul'yanov (Belgorod-Dnestrovskiy port), G. Bug and V. Mishin (port of Nikolayev), and others.

The average additional load on each railroad car in 1979 was 2,343 kg at Odessa, 1,664 kg at Kherson, 1,094 kg at Nikolayev, etc.

In an attempt to increase the effectiveness of rolling stock use, the collectives of the Odessa-port station and Odessa seaport, through their increased skills and experience gained on the compact loading of railroad cars, have taken the initiative of loading an additional 2,000 kg of freight or more onto each car.

The managements of the railroad and steamship company and the trade union committees of the transport organizations recently approved this initiative and confirmed the socialist competition conditions of the acceptance and transfer personnel of the pre-port stations, dockers, tallymen, deputy shift chiefs of the port warehouses, and the stevedores for the best utilization of the carrying capacity and tonnage of the railroad cars and for the right to be called "two-thousanders." A system to account for and sum up competition results has been established.

The participants in the "two-thousander" movement consider that their chief aim is that through their use of railroad cars, they will make their own contribution to the fulfillment of the plans and socialist commitments as a fitting welcome to the 26th Congress of the Communist Party of the Soviet Union.

The number of additional tons loaded and railroad cars freed are the main indicators for the competition winners.

The competition results will be summarized each quarter by a joint decree of the administration and trade union committees of the railroad and steamship agency, ports and pre-port stations.

Incentives have been specified for the "two-thousander" competition. Participants in the socialist competition will be awarded testimonials and letters of appreciation and the competition winners will have their names entered on boards and rolls of honor. In addition to these forms of psychic income, financial incentives have also been provided. There are ten bonuses of 25 rubles each for acceptance and transfer personnel of the pre-port railroad stations who load an additional 1,000-1,500 kg of freight in each car; ten bonuses of 35 rubles each for those who load 1,500-2,000 kg of freight; and ten bonuses of 50 rubles each for loading 2,000 kg and more.

The senior acceptance and transfer personnel will also be rewarded for their fine management of the compact railroad car loading work of their acceptance and transfer personnel if more than 50 percent of their subordinates load 1,000 kg and more into each car. Four bonuses of 50 rubles each, four of 35 rubles each, and four of 25 rubles each have been set aside as rewards for senior acceptance and transfer personnel.

Special attention has been paid to encouraging docker crews. Ten bonuses of 500 rubles each and ten of 350 rubles each have been provided for those crews which load an additional 2,000 kg or more into each railroad car.

Ten prizes each of 50, 35, and 25 rubles have been alloted as encouragement to the brigade leaders of all-round teams, stevedores, tallymen, and deputy warehouse shift chiefs for their fine management of compact railroad car loading work on condition that the port fulfill the static load task.

The "two-thousander" movement grew under the influence of the development of the over-all socialist competition of seamen, port workers, and railroad workers. The collectives of the seaports and railroad stations, as experience shows, have begun to work creatively, more actively seeking ways to speed up the delivery of freight and to make better use of rolling stock.

The new initiative of the sea and railroad transport collaborators has all the more deepened and broadened the possibilities for coordinated action by the two industries whose total forces have been directed at the successful completion of the 10th five-year plan and a fitting welcome to the 26th CPSU Congress.

8524
CSO: 1829

QUALITY OF SHIP REPAIR

Moscow MORSKOY FLOT in Russian No 11, Nov 80 pp 12-14

[Article by Ye. Zyatkovskiy and V. Segodin of the Odessa Ship Repair Yard: "Controlling Ship Repair Quality"]

[Excerpt] Some 143 personal worker's marks--91 of them for industrial workers and 52 for crew chiefs--were presented in 1979. About 400 persons in all are working on self-supervision. In 1971 a new compulsory indicator--a shop production quality coefficient--was introduced into the socialist competition between the plant's shops.

A unit was adopted for the highest value of this coefficient. The value of the coefficient was lowered for various quality control shortcomings. A shop which achieved quality coefficient values of 0.5 and below lost the right to participate in competition. A shop which occupied a prize position in the competition with a coefficient value of 0.7-0.8 received 100 percent of the bonus set for the prize place. If the value of the coefficient decreased to 0.6, the size of the bonus was cut by 20 percent. If the value rose higher than 0.8 and 0.9, the size of the bonus increased by 10 and 25 percent respectively.

At the same time the young generation of advanced workers has been searching for ways to further increase the quality of the work being produced.

In undertaking socialist commitments in 1973, the Young Komsomol dock worker crew of P. Buzinovskiy decided to give a written guarantee for the quality of its work on the dock repair of ships. The crew appealed to all collectives, to all of the plant's crews, to follow its example. This initiative was widely disseminated. The plant's various crews gave 189 guaranteed commitments in 1973, 1,445 in 1977, and 1,849 in 1979.

During this period the more than 130 work crews of the various shops of our plant gave a total of 8,[illegible]37 guaranteed commitments on work to the ship crews. No complaints about the quality of this work were received from the ship crews.

Production quality depends mainly on the quality of the work of ITR [engineering and technical personnel] who are concerned with the preparation and improvement of production and its management. Therefore in recent years we have begun to pay more and more attention to increasing the quality of engineering work.

In 1974 valuation indicators for the work of the divisions of the plant management were created and introduced. Their use led to an increase in quality of the work of the ITR and they are considered when paying bonuses to division workers. A work schedule subject to acceptance by the production foremen without OTK /technical control section/ monitoring has been established to increase the role of production foremen in the struggle for production quality. Work requiring inspection by the USSR Registry and Gosgortekhnadzor /State Committee of the Council of Ministers for Supervision of Industrial Safety and for Mining Inspection/ does not go on this schedule.

In 1975 the OTK was reorganized into an independent structural subunit with five technical control bureaus and checkers and inspectors were drawn from the shop staffs.

The plant medal "Excellent Quality Worker" was established to encourage the laborers, ITR, and office workers.

In 1975 the plant introduced SBT /defect-free work systems/ for the ITR based on the experience of the leading L'vov enterprises. An organizing committee to introduce SBT was created at the plant and an outline of measures was put together. A particular difficulty during the preparation was the need to rework the L'vov SBT option to conform to the conditions of a ship repair enterprise.

After completing the elaboration of temporary regulations for the SBT for the shops and divisions, they began the gradual shift of the plant's subunits to this system. Since 1 January 1976 the entire SRZ /ship repair yard/--21 shops and 26 divisions--has been working under this new system.

A technical bureau, attached to the OTK, which was created at the yard is busy coordinating the work on improving the SBT, summing up the results of the labor quality work, formulating regulations, and adjusting them.

All of the subunits, early in the month following the reporting one, present to the SBT technical bureau established form reports and their complaints about the plant's related subunits. After processing the reports and complaints against the subunits, the council on quality, attached to the chief engineer of the plant, establishes a labor quality coefficient value. The subunit work quality coefficients for the past month are approved at the plant quality evaluation day under the chairmanship of the director of the SRZ. In accordance with these results, the shop and division chiefs conduct their own days at which they determine the labor quality coefficient for the subunit as a whole and also examine the work quality of the sectors, departments, bureaus, groups, and individual laborers.

The size of the average quality coefficient values for the SBT during the past four years shows that the responsibility of the workers for their labor quality significantly rose because it became possible to control ITR work quality.

A regulation on awarding groups of production shop and sector foremen the honorary title "Excellent Quality Group" was developed on the initiative of the leading production foremen. Groups in which no less than 70 percent of the workers have a personal mark can be awarded this title.

In accordance with the experience of the Il'ichevskiy SRZ during 1978, the piece-rate workers of the main production shops and sectors were transferred to work according to a UKP [production quality control] system which permitted the creation of a qualitative evaluation of production and ship repair work performed by teams or individual workers. A 100 percent bonus is paid for achieving a coefficient of 0.8 and higher, and 50 percent for a coefficient value lower than 0.6.

UKP information is processed on a computer and permits a judgment on the production quality in one or another shop, sector, team, the plant as a whole, for any period of time, and also an assessment of the quality of repair of individual mechanisms, devices, systems, and ships as a whole.

The plant has also worked on devising and introducing enterprise standards into production. Some 65 plant standards were introduced during the four years of the 10th five-year plan.

The Odessa yard, along with the Il'ichevsk and Arkhangel'sk SRZ's, is a pivotal enterprise in the industry for the introduction of this complex production quality control system into the industry.

The successful work of a collective depends largely on the quality of the work of the related organizations with which the plant works. Frequently the effectiveness of ship repair goes down because of unsatisfactory initial documentation(repair logs, sketches), the tardiness of their production, the lack of spare parts and materials supplied by the customer, or their late delivery.

The introduction of a UKP into the Black Sea and other steamship agencies and into the industry as a whole will help to eliminate these shortcomings. To successfully resolve this question, quality control divisions in line with the recommendations of Gosstandart [State Committee on Standards] must be created at the plants.

8524
CSO:1829

OCEAN AND RIVER

MORE CONTAINERIZATION, OTHER PLANS FOR RIGA PORT

Moscow PRAVDA in Russian 23 Dec 80 p 1

[Article by Meshkov: "Harbors Will Become More Spacious"]

[Text] Work is proceeding apace day and night in the Riga commercial maritime port. This is one of the oldest harbors. At the same time the port of Riga is young. New structures are growing up here alongside the old ones. Everywhere you see large up-to-date equipment, the port is keeping pace with the needs of the times and of the organization of work.

This is not the first year that Leningrad know-how has been extensively used in the port. A coordinating group has been created; its members include key officials of the port, the Latvian Maritime Shipping Company, the administration of the Baltic Railroad, and of the motor transport association. The dockworkers and railroad workers are combined into four unified mixed shifts of the port and the Riga-Krasta Station. The port's traffic scheduling service compiles a detailed plan-schedule for processing vessels 10 days in advance. The benefit is appreciable: the railroad workers have a real opportunity to prepare in advance to fill orders. It has become easier to move rolling stock around.

The Riga commercial maritime port is becoming more important. That is why construction work never ceases here. To be specific, great changes are taking place on Kundsin'sala Island, located nearby. On some 40 hectares construction workers have laid concrete slabs, and truck cranes and lift trucks are traveling over them. Here the trust Baltmorgidrostroy is building the port's largest cargo area--the container terminal. Construction is already completed on the first facility to be put into operation, which will include a berth and the building of the traffic scheduling service.

The draft of the "Main Lines of USSR Economic and Social Development in the Period 1981-1985 and up to the Year 1990" calls for continuation of the development of seaports in Latvian SSR. A. Polto-abat'ko, deputy chief of the Latvian Maritime Shipping Company for development, capital construction and port management, tells about prospects for development of the Riga and also Ventspils commercial maritime ports:

"The most typical features of a present-day commercial maritime port are containerization, the packaging of shipments, and the use of specialized vessels on an

ever greater scale. The new area of the port of Riga is in fact being built to take this into account. When the work is completed, its capacity will be twice what it is now. Large refrigerated facilities will be built in the new area, which means that the possibility for receiving refrigerated cargo vessels will be expanded.

"What are the plans for the next 4-5 years? Some 400 linear meters of berths are to be built. Up-to-date equipment has already been obtained for the loading and unloading of containers. There are also special tractors and semitrailers. Then we will undertake to build the second phase of the area: this consists of another 1,000 linear meters of berths, machine shops, sheds for storage and for making up containers, and comfortable employee facilities.

"Considerable railroad construction is also to be done. I would like to take this occasion to speak about a circumstance which disturbs us in this connection. Mainly, the Ministry of Railways is supposed to build here the Riga-port railroad station--it took this praiseworthy initiative on its own. A large amount of work was scheduled to be done in 1980, but unfortunately nothing has been done yet.

"Our second commercial port--Ventspils--will also undergo reconstruction and expansion. The construction will by and large be done by the Ministry of Chemical Industry; after all, a plant for manufacturing chemicals for shipment has been built here alongside the port, and is now in operation, and the operation of the port is developing so as to take into account the needs of this plant. Alongside this plant special berths have already been built, and quite recently a complex went into service for pumping liquid potash for export. The Ministry of Chemical Industry will continue construction work on the plant adjoining the port."

7045
CSO: 1829

BALTIC PLANT TO BUILD THIRD ATOMIC ICEBREAKER

Leningrad LENINGRADSKAYA PRAVDA in Russian 10 Jan 81 p 1

[Article by Ya. Strugach: "Rossiya--Name of an Atomic Icebreaker"]

[Excerpt] The day is soon coming when the arc welders will light up their torches and begin attaching to the metal on the high, steep side of the ship the large letters which will form its name--"Rossiya." Yet another atomic icebreaker, sister ship to the "Arktika" and "Sibir'," will be afloat off the entrance to the Baltic Shipyards, ready to go off on its first voyage with the scarlet flag of our nation of soviets waving in the fresh breeze.

What sort of ship will she be? The most characteristic feature of this atomic icebreaker will be the fact that, in her overall appearance, she will resemble her predecessors. This signifies, first of all, that the creative quest of a multitude of work collectives ranging from designers and builders down to the manufacturers of all types of equipment, who were the first in domestic and world shipbuilding practice to lay down the foundation for such vessels, defined precisely and carefully the main principles for the creation of similar vessels over entire decades.

The unprecedented trip of the "Arktika" to the North Pole. The far-flung trip of the "Sibir'," from Murmansk to the Bering Straits confirmed the correctness of those principles and the tremendous capabilities of Soviet shipbuilding. In addition to this, there has opened before us the possibility of practical year-round navigation to the high latitudes which, in turn, means uninterrupted delivery of cargo to new areas being conquered in our nation's Far North.

All of these steps and all of these achievements have found fruition in plans for the atomic icebreaker "Rossiya." The capacity of its engines and its basic technical parameters will be the same as those of the icebreakers which preceeded it. But special systems will increase its ability to cut through the ice. Its navigation and automation systems will be more reliable. There will be a significant change in the design of its superstructure and in the planning and arrangement of its internal structure.

Experience in operating atomic icebreakers has provided our shipbuilders with knowledge as to improving the crew's working and living conditions. Aboard the new ship, the crew will be much more comfortable; there will be a sharp cut in the noise of operating units.

9643
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AIR-CUSHION ICEBREAKER DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Dec 80 p 4

[Article by V. Zubkov: "Flying ... Icebreakers"]

[Text] How does an icebreaker break ice? It climbs up on the edge of the ice with its slanted bow and breaks it with its weight. In this duel force is pitted against force; the strength of the ice and the strength of the vessel's hull are engaged at close quarters.

Now imagine that the decision has been made to use a hovercraft as an icebreaker. No way! you will say. After all, the whole point of such vessels is that the hull does not touch the surface which they fly over. How can they break the ice?

I will not conceal the fact: that is pretty much how the idea of the new model icebreaker was received by many participants in the recent All-Union Scientific-Technical Conference on Prospects for Development of Vessels and Floating Structures. But this did not bother the authors of the paper--V. Zuyev, Ye. Gryamuzov, S. Mokhon'ko and A. Savateyev; they belted the ice of disbelief with the results of theoretical and experimental research.

One of the methods they proposed consisted of an icebreaker moving at a slow speed that would thrust a part of its "cushion" under the surface of the ice. This pressure drives the water away, an air cavity is formed under the ice. Deprived of the water which supports it, the heavy armor plate of ice immediately becomes vulnerable--its own weight working against it. And the crawling icebreaker is pressing down from above with its "cushion." And the ice gives way and begins to crumble.

Research has shown that "flying" icebreakers could be built on this principle even today; at a speed of 8-10 km/hr they would be able to open shipping lanes 16-22 meters wide through ice up to 1 meter thick. It is a curious fact that some of the ice splinters in the depression under the "air cushion" end up disappearing under the edge of the ice sheet. And thus they do not represent a hazard for the ordinary vessels following the icebreaker.

In the opinion of the authors, it would be more advantageous not to make icebreakers of this kind self-propelled, but rather in the form of a kind of "attachment,"

which would be pushed either by a special towboat or by a cargo vessel itself. This would make it possible to reduce the capacity of the power plant of the "attachment," which would be needed only in winter, to 1,000-1,500 HP.

In speaking about a second method of breaking the ice, the specialists revealed that the "air cushion" is not the only means capable of breaking the ice. In principle even heavy sleds using the phenomenon of resonance can cause flexural-gravitational waves in a thick layer of ice capable of shattering it. It is another matter that the "flying" icebreaker can be compelled to move in that regime more simply when the vessel is beginning to operate as a kind of vibrator.

What regime is that? One of its principal characteristics are the so-called resonance speeds of movement, which can go as high as 22-40 km/hr. At these speeds an icebreaker with engines of 3,000-5,000 HP is capable of breaking ice up to 0.3-0.8 meter thick. For most ordinary ice-breaking vessels ice this thick is not merely a limit--when opening a channel of the necessary width, they cannot do more than 1.3 km/hr.

But at this point a reservation can be stated: the "flying" icebreakers do not intend to rival the nuclear-powered giants like the "Arktika" and "Yenisey." The sphere for their use will be the rivers of the Far North, Siberia, the Far East, whose shallow water makes the going difficult even for cargo vessels with ordinary draft.

In these regions it is often only rivers paralyzed by ice or without it that cut through the impassable ocean of taiga; often it is only along them that one can avoid the treacherous morass of the bogs. Probably this is why the shipbuilders at the conference so frequently uttered the word "amphibious craft"--the reference was to vehicles capable of moving over the water, over snow, and even over bogs. Here, of course, the hovercraft has no competitors. Many people have probably already heard about the tests of a platform on an air cushion with a lifting capacity of 60 tons which was built to carry drilling rigs by specialists of the West Siberian affiliate of VNIIneftemash [All-Union Scientific Research, Planning and Design Institute for Petroleum Machinery]. And today there are already designs of platforms with capacities of 100, 200 and even 300 tons. They are moreover "amphibious" platforms.

As conceived by the designers, they will carry cargo along the rivers like ordinary barges--with a towboat. But when they approach shallow water or move on to the shore, they will turn on the "cushion." There is no need to build berths for such platforms; they will be able to carry cargo without transshipment over combined "river--land" routes. Which accounts for their economic characteristics. Calculations show that the "amphibious craft" with 300-ton capacity could save as much as 45,000 rubles on the route from Tyumen' to the Var'yeganskoye field in just one trip carrying equipment in nearly assembled form.

The north, as it is developed, will need not only giant platforms, but also comparatively small "amphibians" to carry people and small cargo. A few such pieces of equipment have been built by the specialists of the Mari Polytechnical Institute. One of them is the hovercraft amphibious snowmobile--the SAVR-1M, which can

carry 3 persons and 500 kg of freight over snow, water and ice, and can traverse boggy sections of the locality. Its two 98-HP engines--for the pusher propeller and "air-cushion" fan--make it possible to move over water at speeds up to 40 km/hr, and over snow up to 70 km/hr. The MPI-20 vehicle has also been built on order of Glavtyumenneftegazstroy [Main Administration for Construction of Petroleum and Gas Facilities in Tyumenskaya Oblast]. But it is worth a separate discussion.

"The air cushion is a rather expensive luxury," says S. Kirkin, staff member of the institute. "That is why we decided to build a machine in which it would be used only in the necessary cases. But in the normal situation the vehicle would move like an ordinary air-propelled sled...."

Tests of the MPI-20 have shown that it moves best over soft snow, broken ice and slush when the "cushion" assumes up to 30-40 percent of the vehicles weight. When moving over wet ground and foggy areas as much as 60-70 percent of the load has to be taken off the skis. And only over dry land or actual water does it operate entirely on the "air cushion." Yet over a dense snow crust and flat ice the vehicle can move like an ordinary air-propelled sled--the fans are not turned on at all.

The lifting capacity of the MPI-20 is 1.3 tons. The capacity of the engine for creating the "cushion" is about 100 HP, and the engine rotating the propellers is half again as large. Its speed is 65 km/hr on snow and a bit less on water. With a full fuel tank it has a range of 500 km. And it does more than just go: if necessary it can cross water-filled trenches 7 meters wide and as much as 2 meters deep! What more could the petroleum industry, the timber industry, geologists and the communications industry wish?

7045
CSO: 1829

BRIEFS

ICEBREAKING FERRY--The Riga Ship-Repair Yard announces completion of work on a new icebreaking ferry. To be named the "Primorets," the new vessel will link Vladivostok with fisheries settlements in the Soviet Far East. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 2, Jan 81 p 3] 9643

SUDOIMPORT CONTRACTS--The USSR Foreign Trade Ministry's Sudoimport Association has concluded a contract with the East German "Schiffskommerz" organization for delivery to the Soviet Union of nine bulk carriers and seven container-refrigerator ships. Also, Sudoimport has contracted with the "Aqua Intertrans" Firm of Australia for the delivery to that country of a small trawler-seiner of the "Baltika" type. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 2, Jan 81 p 20] 9643

GATEWAY TO THE ARCTIC--Every year, about 4,000 Soviet and foreign vessels--timber haulers, container ships, tankers and dry-cargo ships--use the four cargo and passenger piers extending over 13,000 meters of the port of Arkhangel'sk, rightfully known as the gateway to the Arctic. Since the beginning of the year, the port's stevedores have overfulfilled by 100,000 tons their plan for the shipment of cargo to populated points located along the Northern Sea route, to the White, Barents and Kara seas and to the Noril'sk Mining and Metallurgical Combine. Over 95 percent of the port's loading-unloading facilities are completely mechanized. [Excerpt] [Kishinev SOVETSKAYA MOLDAVIYA in Russian 26 Dec 80 p 4] 9643

NEW TRAWLER TYPE--Shipbuilders of the Klaypeda "Baltiya" Yards have embarked upon construction of a new series of fishing vessels. These trawlers will be used to renovate the Caspian Basin fishing fleet. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 1, Jan 81 p 3] 9643

SOVIET-BULGARIAN RAILROAD FERRY--A socialist competition between Soviet and Bulgarian seamen manning the vessels of both nations which serve the Il'ichevsk-Varna railroad ferry has reduced travel time between the two ports to 12 hours. During the 2 years of the existence of the ferry service, provided by the Soviet vessels "Geroi Shipki" and "Geroi Plevna" and by the Bulgarian vessels "Geroi Odessa" and "Geroi Sevastopolya," about 150,000 railroad cars have been hauled between the two ports in over 1,500 crossings. Initiation of the service has meant the freeing of hundreds of large-ton[illegible]ssels for other duties. For 1981, port workers of Il'ichevsk have vowed to cut down to 11 hours and 30 minutes the time necessary to load and unload these ferries and to master a new technology for the handling of automobiles. Varna port workers have also resolved to reduce ferry processing

time and to increase the volume of transported railroad cars and automobiles by 12 percent. [Excerpts] [Moscow IZVESTIYA in Russian 20 Nov 80 p 1] 9643

NEW "RO-RO" VESSELS FOR BLACK SEA FLEET--Seven vessels, among them the "Akademik Tupolev," "Skul'ptor Golubkin" and "Nikolay Cherkasov," now constitute a new, 10th group serving the Black Sea Steamship Line with modern, up-to-date ships onto which cargoes may be rolled. Plans call for the augmentation of this group by the end of 1980, with an additional three such 60,000-ton vessels and to double the number of such ships during the 11th Five-Year Plan. In time, it is intended that these new "ro-ro" ships will link the Black Sea with ports of Southeast Asia and eventually with Japan. [Text] [Kiev RABOCHAYA GAZETA in Russian 25 Nov 80 p 2] 9643

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